



# Marine Birds

Many marine birds rely heavily on habitats and prey associated with the marine nearshore ecosystem of park coastlines. These species are top-level consumers of fish and marine invertebrates, such as mussels, clams, snails, and limpets. Because of these characteristics, these birds are good indicators of change in the marine ecosystem. Our monitoring focuses on birds that are trophically linked to the nearshore food web, such as sea ducks (harlequins, Barrow's goldeneye, mergansers, and scoters) and black oystercatchers as well as various guilds of other marine birds (e.g., pigeon guillemots, blacklegged kittiwakes, and cormorants) that occupy other food webs or habitats. Monitoring these various guilds simultaneously improves our ability to discriminate among potential causes of change in seabird populations and the nearshore ecosystem. For example, some of the species we monitor were impacted by the Exxon Valdez oil spill and exhibited protracted recovery periods as a consequence of lingering oil in nearshore habitats. Public concern exists for the welfare of marine birds because they are currently affected by human activities like pollution and commercial fishing.



NPS/Jim Pfeifferberger

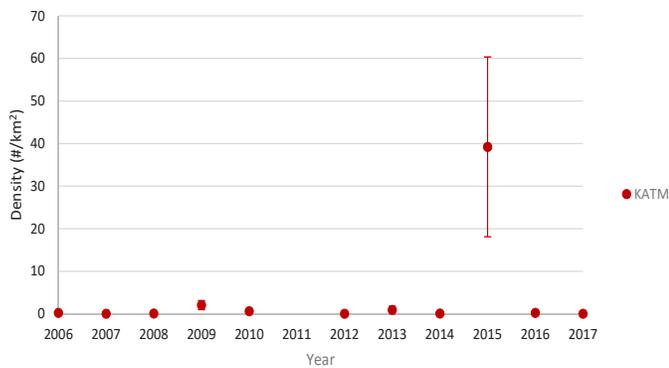
Harlequin ducks in flight, sighted during a winter marine bird survey.

## Findings

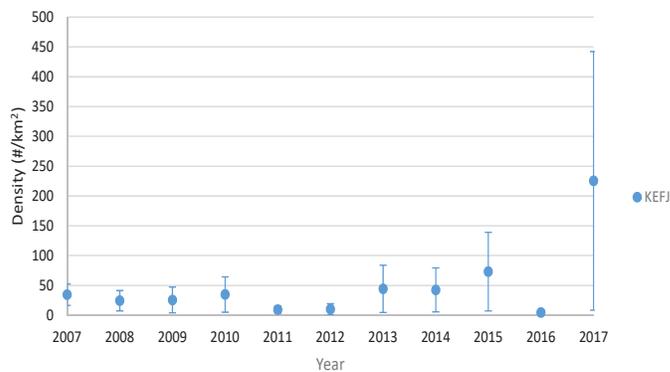
Skiff-based marine bird and mammal surveys along coastal (nearshore) transects have been conducted annually in Katmai National Park and Preserve since 2006 (with the exception of 2011) and annually in Kenai Fjords National Park since 2007. During the summer of 2015, we observed large increases in common murre relative to previous years. This increase was particularly evident in Katmai (Figure 1). Kenai Fjords National Park does have common murre colonies, however, we observed an increase of these birds moving into coastal areas not associated with colonies (Figure 2).

Our documentation of unusual murre distributions corresponded to observations of large die-offs of murre throughout the north Pacific in the winter of 2015-2016. We speculate that warmer water temperatures may have disrupted prey abundance or availability, leading to changes in murre distribution, behavior, condition, and mortality rates. Our results contributed to other observations that 2015 was an anomalous year. Common murre density and distribution returned to normal in 2016 and has continued through 2017. Observations from Kenai Fjords National Park in 2016 were slightly lower





**Figure 1.** Common murre density in Katmai National Park and Preserve (KATM). 2011 was not surveyed. Error bars indicate  $\pm$  1SE.



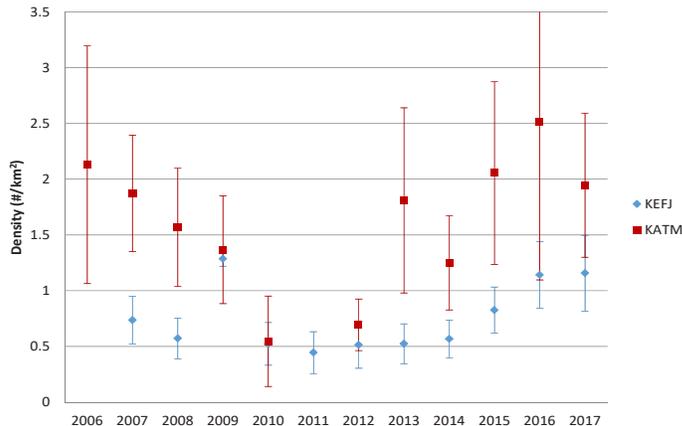
**Figure 2.** Common murre density in Kenai Fjords National Park (KEFJ). 2006 was not surveyed. Error bars indicate  $\pm$  1SE.

than expected, but many transects near colonies were not surveyed due to inclement weather.

In addition to detecting large-scale changes in common murre density, we have also been able to observe an interesting correlation between black oystercatcher density and mussel abundance. In both Katmai National Park and Preserve and Kenai Fjords National Park, black oystercatcher density declined in 2009 when mussel abundance was low, and increased again in 2012-2013 when mussel abundance also increased (Figure 3). Other marine bird species, while highly variable, tend to have relatively stable densities over time with little evidence of increasing or decreasing trends over time.

## Methods

In Katmai National Park and Preserve and Kenai Fjords National Park, ecologists conduct skiff-based surveys along coastal (nearshore) habitats. We collect data that provide baseline information on species composition, distribution, and density for populations of marine birds and mammals that occur in the nearshore waters. Summer surveys are conducted annually and winter surveys are conducted in each park in alternate years as weather permits. Marine bird surveys have been conducted in Katmai and Kenai Fjords since 2006 and 2007, respectively.



**Figure 3.** Black oystercatcher density in Katmai National Park and Preserve (KATM) and Kenai Fjords National Park (KEFJ). 2011 was not surveyed in KATM while KEFJ was not surveyed in 2006. Error bars indicate  $\pm$  1SE.



Black oystercatchers.

